INTEGRATIVE COMPLEXITY AND IMPRESSION FORMATION

BY

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To Janie, Hannah and Grace

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A measure of the integrative complexity of personal constructs is described. The effectiveness of this measure in predicting the resolution of inconsistent information was compared with that of Crockett's cognitive complexity measure. The interaction of these measures with cognitive set was also investigated. Results suggest the integratively complex person may be more responsive to cognitive set manipulations. Integratively complex persons asked to be understanding vs. evaluative were more likely to resolve inconsistencies than were integratively complex subjects asked to be evaluative. A follow up study suggests the integratively complex person tends to resolve

inconsistencies more than the person low in integrative complexity, when no cognitive set is elicited. The results suggest the integrative complexity measure could be useful in gaining a better understanding of personal constructs and impression formation.

CHAPTER I
INTRODUCTION OF THE PROBLEM

The psychology of personal constructs (Kelly, 1955) suggests that the person is best understood by looking at the interpretations the person places on events. Personal construct psychologists refer to these interpretations as personal constructs and assume these constructs are organized in systems that characterize their user's personality. The organization of a construct system is often referred to as the structure of the system. Considerable research has been done by personal construct psychologists on the measurement of construct system structure. These explorations have been guided by the belief that knowledge of the structure of construct systems will lead to a better understanding of specific persons as well as of personality in general.

Studies of personal construct system structure have largely focused on two aspects of construct systems which are referred to as differentiation and integration. Differentiation refers to the use of many constructs to perceive the world. Integration refers to the organization of the constructs used by the person in perceiving the world. The integrated construct system contains constructs

that are systematically related to one another and that form a coherent view of the world.

A number of psychologists (Allport, 1937; Werner, 1948; Piaget, 1973; Kelly, 1955; Kaplan and Crockett, 1968; Harvey, Hunt and Schroder, 1961; Adams-Webber, 1979) suggest differentiation and integration may be components of a larger developmental process. These theorists suggest the person is capable of achieving greater levels of both differentiation and integration by coordinating these processes. This coordination is accomplished by developing abstractions that organize a wide range of events within a coherent conceptual framework. The more differentiated the range of events considered, the more comprehensive the abstraction needs to be. Using more comprehensive abstractions also provides a format for greater differentiation. Such abstractions direct the attention not only to immediate concrete events but also to all the logically possible events included in the abstract construct. The person that has more ways of looking at the world is more likely to develop highly abstract constructs to organize these experiences and the person that is better able to form abstractions will have a wider range of hypothetical perspectives to elaborate. Harvey, Hunt and Schoder (1961) described this process of coordinated integration and differentiation as integrative complexity.

Although the notion of integrative complexity has been acknowledged in personal construct theory, there has been an absence of the highly flexible measures of integrative complexity needed in the experimental and clinical elaboration of personal construct theory. The search for flexible measures of construct system structure has generally focused on the repertory grid technique (Bannister and Mair, 1968 ; Fransella and Bannister, 1977). The repertory grid is a matrix of numbers generated by having a person rate or rank a set of events or people along a number of construct dimensions. The repertory grid is highly flexible because the people and constructs being rated or ranked can be varied to suit the experimenter's or clinician's interests. The numbers of the grid can be analyzed to produce indices of construct system structure. Unlike the content analyses that are sometimes used to study construct systems, grids can be analyzed quickly.

A variety of grid procedures have been developed to measure either differentiation or integration (Fransella and Bannister, 1977). Only one grid technique has been constructed, however, to measure integrative complexity. Using a grid technique called the coordinate grid, Chambers (1983, 1984) described and analysis that provides an index of integrative complexity. The procedure is an extension of principles developed in the theories of lattice structures (Piaget, 1973), multidimensional unfolding techniques

(Coombs, 1964) and feature analysis (Tversky, 1977). The validity of the coordinate grid measure of integrative complexity was supported by mathematical simulations and by personality inventory studies. In the present study the usefulness of the coordinate grid measure of integrative complexity will be further explored by comparing its power to predict developmentally advanced construction with that of a set of well established laboratory procedures.

Integrative complexity is described as a process in which differentiation and integration form a unified process. Developmental psychologists like Piaget (1973) and Werner (1948) stress that it is the coordination of these cognitive processes that characterize developmentally advanced construction. As a developmentally advanced process, integrative complexity should be more directly related to advanced cognitive achievements than should individual differences in either integration or differentiation in isolation. Some empirical findings of relevance to this assertion were described in a set of studies by the personal construct psychologist Walter Crockett. Using a differentiation measure called cognitive complexity, Crockett et al. (1975) found evidence linking differentiation with the person's ability to use abstractions to resolve inconsistent information in impression formation. Differentiation was only predictive of such resolution, however, when the complex person was

asked to embrace a cognitive set that facilitates integration. This set was developed by asking subjects to try to understand vs. evaluate another person. These findings suggest integration and differentiation can be experimentally synthesized in the laboratory situation.

The Crockett et al. (1975) findings linking an understanding cognitive set with greater integration point to a component of integration that is different from that of the cognitive development component. The understanding set is likely to encourage the subject to attend to all the characteristics of a person, whereas an evaluative set is likely to direct the subject's awareness to a narrow range of characteristics that are primarily only relevant to safety needs or task oriented issues. The development of comprehensive abstractions requires the person's attending to a wide range of characteristics as well as the cognitive ability to form abstractions. Although cognitive set manipulations may facilitate the integration of information up to a certain point, such manipulations could not be expected to accelerate the development of cognitive ability. The experimental coordination of differentiation and integration developed by Crockett et al. (1975) can thus not be assumed to incorporate the developmental component of integration. The interaction found by Crockett et al. (1975) between cognitive set and differentiation probably therefore has limited use as a predictor of such advanced

construction as the resolution of inconsistent information in impression formation.

In that the Crockett et al. (1975) experimental coordination of differentiation and integration fails to account for the developmental component of integration, the interaction between cognitive set and cognitive complexity should be less effective in predicitng resolution than would be a more direct measure of integrative complexity. The coordinate grid measure of integrative complexity does provide a direct measure of the final product of the coordination of differentiation and integration. This measure appears to reflect both the developmental and attentional components of integration. The coordinate grid should thus be a more effective predictor of resolution than should be the interaction Crockett et al. (1975) found between cognitive set and cognitive complexity.

Results consistent with the above assertions would add clarity to our understanding of the relationships between differentiation, integration and integrative complexity. Such findings would also further support the validity of the coordinate grid. The coordinate grid is a highly flexible method that can be used in a wide range of experimental and clinical contexts. The grid could therefore be instrumental in the elaboration of the nature of advanced construction and personality processes.

In summary, this study will address the effectiveness of the coordinate grid measure of integrative complexity versus the effectiveness of the interaction between cognitive complexity and cognitive set as predictors of the resolution of inconsistent information in impression formation. The coordinate grid and the interaction experimentally coordinated between differentiation and integration by Crockett's methods should each predict the resolution of inconsistencies. Crockett's procedures, however, could not be expected to indicate the cognitive ability of the person to integrate information. The grid should be more effective than Crockett's methods in predicting such resolution because it provides an index of the final outcome of the coordination of differentiation and integration. As such, both the cognitive development and attentional components necessary for the development of highly complex but integrated impressions are reflected in the grid method. Results consistent with these assertions could improve our understanding of integrative complexity and personality.

CHAPTER II
REVIEW OF THE LITERATURE AND STATEMENT OF THE PROBLEM

Developmental Approaches to Cognitive Structure

The evolution of personal constructs was described by Adams-Webber (1979); Makhlouf-Norris, Jones and Norris (1970); and Kaplan and Crockett (1968) as a movement from the use of undifferentiated and poorly organized constructs to the use of highly organized constructs that allow people to systematically articulate the events they experience. These researchers describe this evolution by reference to Piagetian and Wernerian conceptions of cognitive growth.

From a developmental perspective, cognition advances as the child uses more abstract constructs to systematically elaborate the world. Piaget (1973) points out that the child reaches an advanced level of reasoning when abstract conceptualizations of all the logically possible relationships between a set of events are used. Such abstractions organize the person's exploration of life by channelizing the awareness to all the permutations of a set of events. Such abstract strategies of inquiry are used in scientific research and allow the scientist to integrate a plethora of observations and hypothetical views of a set of variables. Piaget suggests such construction possess a quality called lattice structure.

Lattice structures are abstract constructs that direct the person's inquiry to all the possible relationships between a set of variables. Such construction requires a systematic articulation of variable relationships, with each relationship representing a different facet of the overall lattice structure.

It is possible that relationships between various personal constructs may also be organized as different facets of an overall integrating construct. In this case integrative complexity could be conceptualized as the variety of the facets that elaborate the integrative construct. Greater integrative complexity would occur when the person differentiates elements in various but distinct ways.

Since lattice structures are systematically differentiated in complex ways, it is reasonable to assume that an assessment of the lattice structure of personal constructs could afford an index of integrative complexity. This assumption follows from Piaget's conclusion that the implicit use of lattice structures indicates the use of highly integrative abstractions and is a developmentally advanced activity. By basing a personal construct measure of integrative complexity on Piaget's theory of lattice structures, a possible link between integratively complex construction and cognitive development could be forged. Such an association would agree with the general notion of

integrative complexity that has emerged from many theorists' interpretations of personality development.

The systematic coordination of various forms of differentiation is not tapped by most of the measures of structure that have been used by construct theorists. The grid measures of differentiation that have usually been applied by construct theorists have only addressed the extent to which constructs are, on average, correlated. No indication of the various ways these correlations systematically vary from one another is provided in these measures. For this reason most measures of differentiation fail to reflect the complexity of construct relationships. A measure of integrative complexity must, however, address the complexity of the relationships between the elements of an integrating construct. A grid procedure derived from the principles of lattice structures could provide a new and meaningful approach to integrative complexity. A review of repertory grid procedures used to measure construct system structure will now be undertaken in order to more closely address the issues of measuring integrative complexity.

Repertory Grid Measures of Construct System Structure

Differentiation vs. Integration

The coordination of integration and differentiation was described by Harvey, Hunt and Schroder (1961) as integrative complexity. These authors point out that the

integratively complex person uses abstractions to integrate a wide range of experiences. Goldstein and Blackman (1978) summarized results from a number of studies in which people have attempted to correlate grid measures of construct system structure with Harvey, Hunt, and Schroder's (1961) laboratory measures of integrative complexity. These studies were largely unsuccessful. A probable explanation for the lack of relationship between grid measures and other measures of integrative complexity is the fact that these grid techniques assume differentiation and integration are opposites.

In discussing lattice structures and advanced cognitive operations, Piaget (1973) points out that differences and similarities are coordinated to form a highly elaborate network of relationships. From Piaget's (1973) perspective, differentiation and integration of constructs are not mutually exclusive. Most repertory grid studies have, however, employed correlational methods that provide a general index of similarity in order to assess construct system structure. The basic assumption of these studies has been that correlated constructs are more integrated while constructs that are applied in a noncorrelated fashion reflect greater differentiation. This assumption has led to a number of theoretical and empirical contradictions in the construct literature.

Construct theorists have associated integration with similarities while differentiation has been linked with the absence of similarity. This distinction has been the basis of very simple statistical procedures such as simply counting the number of identical ratings applied in rating an event on two constructs (Bieri, 1965) and to very complex procedures such as the use of principal components analysis (Slater, 1977). Implicit in the use of these procedures is the assumption that integration and differentiation are opposites. There has been some confusion as to the meaning of results obtained by such methods. Bieri (1965) assumed that the person who tended to apply constructs in similar ways to different events was cognitively simple. Cognitive simplicity, as opposed to cognitive complexity, was shown to characterize people who were less successful in predicting others' behaviors. This suggests cognitive differentiation is a quality of advanced construction. Bannister and Fransella (1966), however, assumed that correlated constructs indicated the person's having organization in their construct system. These researchers found low correlations between constructs to be associated with schizophrenia, an illness often associated with regressed thought processes. Low correlation was thus described as an indication of less integration by Bannister and Fransella but as an indication of differentiation by Bieri.

Radley (1974) and Langley (1971) recognized this conflict between differentiation and integration measures and suggested caution in making structural interpretations of correlations between constructs. The application of constructs in a correlated fashion could imply either low differentiation or high integration. These grid methods contrast differentiation and integration and are thus not useful for obtaining indices of integrative complexity.

Differentiation and Integration

An endeavor to provide nonmutually exclusive measures of differentiation and integration has been carried out by Landfield (1977). Landfield suggested that differentiation could be measured by determining the extent to which the person uses different ratings in applying a construct to numerous events. Differentiation in this sense refers to differences between constructs. Landfield suggested integration could be measured by determining the extent to which differentiation of events occurred within constructs. He referred to this form of integration as ordination. Ordination occurs when the person orders events along a construct dimension in a heterogeneous fashion. Such ordination reaches its peak when the person rates events using all the intervals allowed in the specified rating scale while rating the events on a particular construct.

Landfield's ordination measure is interesting in that it is based on the assumption that greater integration and heterogeneity are not mutually exclusive. Landfield develops this theme by showing that differentiation and ordination serve as orthogonal coordinates that are particularly useful in clincial characterizations of people. Some people are high in differentiation and low in integration. Others are just the reverse. Some people are high in both integration and differentiaton while others are low in both. These profiles define a quadrant of personality types that reflects various combinations of individual differences in integration and differentiation. As promising as Landfield's measures are, there are several problems with using the methods to reflect integrative complexity.

One problem with using Landfield's techniques to measure integrative complexity concerns the ambiguities in combining separate measures of differentiation and integration. Who is more integratively complex, a person high in integration but low in differentiation or a person of moderate talents in both areas? A conservative approach would be to discount all but those who are either low or high in both areas in performing research. This would perhaps be a legitimate but costly research strategy in that considerable information would be lost in discarding so much data. The ambiguities in combining Landfield's measures in order to obtain an

index of integrative complexity pose formidable problems that have no apparent solution.

An even more pressing difficulty with Landfield's measures is the problem of random ratings. Random ratings probably represent the extreme in low integrative complexity since by definition each random rating possesses no systematic relation to any other ratings. Random ratings could however be expected to lead to rather high differentiation and integration scores on Landfield's tests because these measures reflect heterogeneity. Since Landfield's measures fail to distinguish between arbitrary heterogeneity and elaborate organization, these measures are probably of limited use in measuring integrative complexity.

The problem of random relations between constructs was addressed by Bannister and Fransella (1966) in their development of a grid test of schizophrenic thought disorder. They suggested that poorly organized constructs would change from one moment to the next. In order to demonstrate this, Bannister and Fransella (1966) administered their grid test on an immediate test-retest format. They found thought-disordered schizophrenics tended to have very low test-retest reliability in their constructions and they tended to use these constructs in an uncorrelated fashion within each test session. Their conclusion is that the intensity of interconstruct

correlations within tests and the consistency of these constructs across testings combined to provide a good measure of organized vs. random construction. There are several problems in using Bannister and Fransella's correlation intensity and test-retest consistency measures to reflect integrative complexity.

A major problem with using the Bannister and Fransella (1966) measures to reflect integrative complexity is the same problem confronted in the discussion of ambiguities implicit in combining Landfield's (1977) measures. Who would be more integratively complex, a person who applies constructs in a correlated fashion in the first test session but applies the constructs is a different fashion in the retest or a person with moderate scores on both testings or a person who consistently uses uncorrelated constructs? As with Landfield's (1977) methods, there appears to be no unequivocal way to assess integrative complexity by combining separate measures of integration and differentiation.

A second problem with Bannister and Fransella's (1966) answer to the problem of random ratings or ranks concerns the orientation towards change that is built into personal construct theory as defined by Kelly (1955). Kelly described construction as a process that undergoes considerable change. Kelly suggested that change is a natural part of construction. This may be especially

relevant to repertory grid research in that people completing a grid are likely to make explicit a number of constructions never before expressed. The person is likely to monitor these constructions and may well make immediate revisions in their constructions. The author has seen this occur several times in administering grids on an immediate test-retest basis to apparently healthy college students. People can think very quickly and revisions in construction may represent simple changes of mind. The argument could be forwarded that such immediate changes are surely indicative of psychological instability. This assertion could however be countered with the question of just how much time should be considered a healthy period in which to reformulate constructs. There may be a good answer to this question but we are left with probablities in distinquishing between the quick-minded and the random constructions of the psychologically unstable. Such informed guesswork is itself an unstable foundation for studying the integrative complexity of personal constructs. The problem of random construction is thus not resolved by the use of Bannister and Fransella's grid measures.

Integrative Complexity

In recent research by Chambers (1983, 1984) the problem of distinquishing random grid ranks from integratively complex ranks was resolved using a measure called the

coordinate grid. The coordinate grid measure of integrative complexity assesses the extent to which the person uses lattice structures to articulate all the possible relationships between a set of people. Piaget (1973) associated the use of lattice structures with the use of abstractions to organize complex experiences. He contrasted such advanced operations with the random attributions associated with cognition in young childhood. Piaget suggested that the child transcends fixations on arbitrarily dominant features of experience by undertaking an investigation based on knowledge of all the possible perspectives on an event. As a measure of the implicit use of lattice structures, the coordinate grid should thus reflect the person's use of advanced forms of construction.

It is the awareness of abstract possibilities that both Piaget (1973) and Kelly (1955) associated with advanced construction. As the person employs comprehensive abstractions there emerges a wider perspective and greater intellectual freedom to view the world in many ways. Kelly linked this freedom to entertain alternative constructions with the person's willingness to embrace new propositions. Kelly emphasized the importance of the person's adoption of a credulous approach to life as essential for the development of such propositional construction. Kelly and Piaget linked this propositional construction with hypothetical construction. Kelly emphasized the personality

characteristics of such advanced construction while Piaget described the stages of the development of such construction. To both theorists hypothetical construction was contrasted with concretism. These authors saw prejudices based on concretisms and skepticism as major deterrents in the development of integratively complex construction. To each theorist advanced constructions were elaborately organized, afforded the person many coherent perpectives and required a willingness to embrace abstract propositions of what is possible instead of only directing the attention to what concretely exists or is of relevance to a particular need. This integrative complexity was contrasted with fragmented and incidental constructions based on attending only to dominant concrete features or emotionally threatening qualities of an event.

In order to assess the coordinate grid's ability to distinquish between the random rankings of fragmented construction and the highly elaborate rankings of integrative complexity, Chambers (1984) employed mathematical simulations and particular kinds of instructions in administering the grid. In order to simulate the extreme in fragmentation, a set of coordinate grids was completed by drawing ranks from a table of random numbers. A second set of grids was obtained in order to assess normal levels of integrative complexity. These grids were developed by asking college students to rank a set of

people they knew to one another in terms of their intelligence.

A third set of grids was developed in order to elicit moderate levels of fragmentation from similar college students. These students were told that Eysenck (1970) had demonstrated that introversion and intelligence are not correlated. A person that is highly intelligent is just as likely to be introverted as extraverted. This was further illustrated by asking the subjects to list the names of two highly intelligent introverts, two highly intelligent extraverts, two moderately intelligent introverts and two moderately intelligent extraverts. The original instructions had been to list people of low intelligence but several subjects objected that they did not know anyone of low intelligence, so the request was changed to moderate intelligence. This task helped the subjects see that introversion and intelligence did not imply one another in the same way they would imply one another if they were correlated. The subjects were then asked to rank ten people listed on the grid to one another in terms of their similarity with respect to both introversion and intelligence simulataneously. Such ranking requires the ordination of ambiguous variables and can not be solved unless the subject simply ignores the instructions and employs a more abstract construct that implies both introversion and intelligence. The point of this impossible

task can be illustrated by asking: If Mary is highly introverted and highly intelligent, who is more like her, John, who is highly intelligent and highly extraverted or Paul, who is highly introverted but of low intelligence? There is no unequivocal answer to this question and an attempt to think in this fashion will produce fragmented hierarchies of similarity.

As expected, the lowest integrative complexity scores were obtained from the grids composed of random ranks. Moderate scores were obtained from the group who were asked to rank according to both intelligence and introversion simultaneously while the highest scores were obtained from the group asked to rank according to intelligence. The results were highly statistically significant and illustrate the continuum of construction from completely fragmented to normal construction. The results show that the notion of lattice structures and the coordinate grid operationalization of this principle can be quite effective in differentiating random ranks from integrated judgments.

Chambers (1983, 1984) further explored the validity of the coordinate grid measure by examining the relationship between integrative complexity and personality. The coordinate grid and a number of personality inventories were administered to college students. Subjects scoring more integratively complex on the grid tended to be more flexible, spontaneous, trusting and open-minded. Subjects

low in integrative complexity were found to be more skeptical, cautious, rigid, inhibited and shy, according to the 16 P.F. Inventory . These traits are directly relevant to Kelly's notion of the credulous approach to life. The results suggest integratively complex people are more likely to elaborate their experiences of the world since they approach events with trust, spontaneity, enthusiasm, and open-mindedness. In approaching life in this credulous fashion the person is likely to attend to many aspects of an experience. In a more incredulous orientiation the person would be more likely to evaluate experiences by attending only to factors of relevance to basic safety needs. These results suggest the integratively complex person is likely to attend to the world in a fashion that facilitates the development of comprehensive perspectives.

Further support for the validity of the coordinate grid measure of integrative complexity comes from comparisons made between the grid and a personal construct inventory measure of propositional construction and a measure of Harvey, Hunt and Schroder's (1961) notion of integrative complexity (Chambers, 1984). Results showed the grid scores were correlated with the use of propositional constructs and with the other integrative complexity measure. These results support the validity of the coordinate grid as a measure of integrative complexity and suggest further research with the method is warranted.

In summary, studies using the coordinate grid measure suggest the integratively complex person is not random in elaborating the similarities and differences between people but employs lattice structures that direct the attention to a wide range of possible experiences. The use of such advanced cognitive structures would allow greater flexibility in exploring life in that more avenues of alternative construction are open to the person. Experimental results from applications of the grid and personality tests suggest the integratively complex person tends to be more flexible, spontaneous and enthusiastic as well as more likely to embrace a wide range of propositions concerning life and human nature. Results also suggest the integratively complex person tends to use abstractions to organize experiences and tends to avoid concretisms and dogmatic oversimplifications. Keeping in mind the constraints associated with the use of self-report methods, these findings are congruent with the numerous theoretical assertions that link more developed constructions and personalities with integrative complexity. The validity of the coordinate grid is supported by the technique's ability to reflect both personality and cognitive components of integrative complexity. These findings encourage further research with the method.

Cognitive Complexity, Cognitive Set and the Resolution of Inconsistent Information

Probably the most extensive research on construct system structure has been led by Walter Crockett (1982). Using a measure called cognitive complexity, Crockett (1982) and his associates have demonstrated the ways in which differentiation effects a number of processes in impression formation and information processing. Crockett's (1965, 1982) measure of cognitive complexity provides an index of differentiation and is derived by counting the number of separate constructs used by a subject in describing four people they know well. The measure has been used a number of times in conjunction with other laboratory procedures and has proven to be a reliable means of studying personal constructs within the laboratory context.

The validity of Crockett's (1965) cognitive complexity measure has been demonstrated in a number of studies. Cognitively complex persons have been shown to be less reliant on simple unidimensional linear-order relationships between constructs (Press, Crockett and Rosenkrantz, 1975; Delia and Crockett, 1973). The cognitively complex person has also been shown to be better than the cognitively simple person at taking on other persons' perspectives (Clarke and Delia, 1976). Delia, Kline and Burleson (1979) and Hale and Delia (1976) also showed the cognitively complex person is more flexible in social perspective taking as well as being more adaptable in the formulation of strategies for

persuading others of some issue. These studies suggest the cognitively complex person has a richer repertoire of constructs by which to interpret and respond to the world.

Several studies have been conducted to explore the relationships between cognitive complexity and the use of developmentally advanced forms of abstraction. Cognitively complex persons have been shown to be more effective in using abstractions to resolve ostensibly inconsistent information about another person in impression formation (Mayo and Crockett, 1964; Nidorf and Crockett, 1965; Delia, Clarke and Switzer, 1979; O'Keef, Delia, and O'Keef, 1977). This relationship between cognitive complexity and the resolution of inconsistent information was further shown to be contingent upon the subject's embracing a cognitive set that facilitates integration (Crockett, Mahood and Press, 1975; Press, Crockett, and Delia, 1975). Integration was facilitated in these studies by asking subjects to adopt an understanding vs. an evaluative cognitive set in considering the information provided about a stranger.

In the understanding set the person was asked to read information about a stranger in order to gain an understanding of the person. In the evaluative set the person was asked to evaluate the stranger on the basis of the information. These cognitive sets are likely to have an effect on the type of information the subjects will attend to in forming their impressions. In the understanding set

the subject is likely to attend to all of the information as being of relevance to gaining an understanding of the person. In the evaluative set the subject is likely to judge only some of the information to be of relevance to evaluation. The understanding set invites the subject to attend to all the information while the evaluative set encourages the subject to attend only to characteristics of relevance to the basic safety or task oriented issues that are usually associated with the processes of evaluation. The understanding set thus encourages a broader integration of information while the evaluative set narrows the range of attention to a less integrative focus.

Crockett et al. (1975) linked the understanding cognitive set to personality characteristics and styles of communication described by Rogers and Stevens (1967) and Kelly (1955). The evaluative set is essentially based on an incredulous examination of a person's standing with respect to a few characteristics of preemptive importance. The person performing an evaluation enters their experience of the stranger with specific concerns. The understanding approach, on the other hand, is more spontaneous and less wary. The person takes a more open-minded orientation to the stranger and seeks only to discover the person . Although this approach could be expected to facilitate the integration of information, such facilitation could not be expected to accelerate the cognitive ability of the person

to form abstractions. People can be encouraged to pay attention to many characteristics of another person. Unless this incorporation of many factors is accompanied, however, by the ability to organize this information, it will be unlikely that the person will be able to develop the complex and coherent impressions necessary to resolve inconsistent information.

Crockett's cognitive complexity and cognitive set procedures are probably useful in coordinating differentiation and integration up to the level that the person is developmentally able to perform. These procedures probably cannot accelerate cognitive development. The coordinate grid, on the other hand, was designed to measure the final outcome of such coordination and has been conceptualized and explored as a measure of both attentional and developmental factors. It is therefore reasonable to assume that the coordinate grid measure of integrative complexity will be a better predictor of such advanced cognition as the resolution of inconsistencies, than will be the interaction between complexity and set developed by Crockett et al. (1975). This is the primary assertion of this study.

Rationale of the Study

Developmental psychologists have stressed the importance of the coordination of differentiation and integration in the genesis of advanced forms of cognition. Crockett and his associates have shown how the coordination of differentiation and integration can be experimentally facilitated and that this synthetic coordination is predictive of a particular form of advanced construction called the resolution of inconsistencies. Chambers (1983, 1984) developed a direct measure of the coordination of integration and differentiation which should also be predictive of this advanced form of abstract cognition. In fact, the grid should be a more effective predictor of resolution than is the demonstrated interaction described by Crockett and his associates. This is because the coordinate grid directly measures integrative complexity, a process requiring both developmentally advanced forms of construction as well as a cognitive set that directs the attention to a comprehensive appreciation of the world. Crockett's (1982) differentiation and cognitive set interaction encourages the development of comprehensive abstractions but cannot be expected to actually accelerate cognitive processes beyond the person's developmental potential. Even if they embrace a cognitive set designed to expand attention to many areas, some people will probably be less competent in the development of the abstractions

required to resolve inconsistent information. This is because they will only be able to develop these abstractions as well as their cognitive development allows. By including the cognitive set manipulation, Crockett's (1982) procedures account for an attentional component that facilitates the formation of comprehensive abstractions but fail to measure the cognitive ability of the person to actually coordinate differentiation and integration.

Demonstrating that the coordinate grid is more effective than Crockett's procedures in predicting resolution would further support the validity of the coordinate grid measure of integrative complexity. Unlike Crockett's procedures, the coordinate grid is a direct measure of the coordination of integration and differentiation and directly reflects features of both personality and cognitive development. As a repertory grid technique it is also not limited to laboratory contexts and could prove a highly flexible instrument for both experimental and clinical work.

Crockett's (1982) methods are particularly germane to the issue of the coordination of differentiation and integration. Crockett's research has also provided some of the most precisely formulated and replicated findings in personal construct psychology. This body of theory and research is thus likely to be a very good point to further explore the nature of integrative complexity. The present study will thus address the comparative effectiveness of

Crockett's procedures and the coordinate grid as predictors of the resolution of inconsistent information in impression formation.

Several predictions are warranted in drawing a parallel between Crockett's (1982) methods and the coordinate grid. Crockett and his associates have found that the adoption of an understanding cognitive set leads to greater resolution of inconsistencies. They also found cognitive complexity to be predictive of resolution when in interaction with an understanding cognitive set. In the present study these findings are expected to be replicated. It is also predicted that the coordinate grid index of integrative complexity will be correlated with the level of resolution of inconsistencies, since both of these cognitive activities represent developmentally advanced forms of construction. Crockett's measure of cognitive complexity is an individual differences measure of differentiation. Since differentiation is described as one of the components of integrative complexity, it is likely that a moderate correlation will be found between cognitive complexity and the grid measure of integrative complexity.

A final prediction concerns the comparative effectiveness of Crockett's (1982) methods and the grid as predictors of resolution. The grid is a direct measure of the coordination of integration and differentiation while Crockett's experimental procedure only encourages the

coordination of integration and differentiation. The cognitive set manipulation used by Crockett et al. (1975) is designed to effect the subject's selection of information in forming an impression. Although the cognitive set component is important in forming integrative abstractions, the person must also possess the cognitive ability to formulate the abstractions required to resolve inconsistent information . It is likely that some subjects will not have sufficient cognitive ability to formulate such abstractions even though they have embraced an understanding cognitive set. Because the Crockett et al. (1975) cognitive set manipulation only facilitates the attentional component of integration and probably can not accelerate cognitive development, it is likely that the cognitive complexity and cognitive set interaction will not be as effective in predicting resolution as will be the integrative complexity measure. The coordinate grid measure reflects actual levels of the coordination of integration and differentiation and appears to reflect both attentional and developmental components of integrative complexity. If Crockett's attempt to coordinate integration and differentiation really does fail to account for differences in cognitive development and the integrative complexity measure does reflect this component, then this difference between these measures of coordinated integration and differentiation should be experimentally demonstrable.

The effect of cognitive development on resolution could be demonstrated by statistically controlling the attentional component in predicting resolution from cognitive complexity and integrative complexity. This could be accomplished by comparing the predictive effectiveness of cognitive set and integrative complexity as combined main effects vs. the effectiveness of the interaction between cognitive set and cognitive differentiation. Differences between these composite predictors of resolution are not attributable to factors of selective attention but to cognitive factors not accelerated by the cognitive set manipulation. Since the integrative complexity measure is assumed to include developmental factors that could not be generated by a cognitive set manipulation, it is predicted that cognitive set and integrative complexity will together be more effective predictors of resolution than will be the interaction between cognitive set and cognitive complexity. Such a finding would illustrate the developmental factors not controlled in Crockett's experimental coordination of integration and differentiation.

Hypotheses

Hypothesis I. Higher levels of integrative complexity will be predictive of greater resolution of inconsistencies.

Hypothesis II. Subjects asked to embrace an understanding cognitive set will be more effective in resolving inconsistencies.

Hypothesis III. Cognitively complex subjects that are asked to embrace an understanding cognitive set, will be more effective in resolving inconsistencies than will all cognitively simple subjects, as well as those cognitively complex subjects that are asked to be evaluative.

Hypothesis IV. There will be a significant but moderate correlation between cognitive complexity and integrative complexity.

Hypothesis V. Integrative complexity and cognitive set, as combined main effects, will be more predictive of resolution than will be the interaction between cognitive complexity and cognitive set.

CHAPTER III
METHOD

Overview of the Design

This study is a comparison of the effectiveness of the coordinate grid vs. the interaction of cognitive set and cognitive complexity as predictors of the resolution of inconsistent information in impression formation. There are three independent variables and one dependent variable in this study. Two of the independent variables are individual differences measures of integrative complexity and differentiation. Integrative complexity is measured by Chambers' (1983) coordinate grid procedure and differentiation is measured by Crockett's (1965) cognitive complexity measure. The third independent variable is a cognitive set manipulation developed by Crockett, Mahood, and Press (1975) to facilitate integration. The dependent variable was developed by Kaplan and Crockett (1968) to reflect the resolution of inconsistent information in impression formation.

Subjects first completed the coordinate grid and cognitive complexity measures. The order of the administration of these tests was counterbalanced to control possible order effects. Subjects were then given six

paragraphs containing conflicting descriptions of a stranger. Half of the subjects were asked to read the descriptions while embracing an understanding cognitive set while the other half of the subjects were asked to employ an evaluative cognitive set in reading the paragraphs. The order of the paragraphs was counterbalanced to control order effects. After reading the six descriptions all subjects were asked to write their impression of the stranger in a fashion that would be highly informative to a friend that does not know the stranger. These written impressions were scored to determine the extent to which the subject uses abstractions to resolve the inconsistent information presented in the six paragraphs.

Integrative Complexity: The Coordinate Grid

The integrative complexity index was derived from the coordinate grid procedure. The coordinate grid used in this study consists of a matrix of ten columns and ten rows (see Appendix A). The headings of the rows and columns are ten people known to the subject. The same people are used to head both the rows and the columns. The subject is asked to begin with the first row and to determine which of the people across the columns is in general most similar to the person whose name heads the first row. The first rank is given by the experimenter. The person is assumed to be most like their self. The subject thus begins ranking with the

number 2. After this rank has been assigned the subject finds the column person next most like the person heading the first row and assigns this column person the rank 3. This ranking continues until all the column persons have received a rank on the first row. The subject then goes to the second row and ranks the column people in terms of their similarity to the person heading the second row. When every column has been assigned a rank on every row then the grid is complete. The people ranked on the grid were specified by the subject but met one of the following ten characteristics: A. Self, B. Mother, C. Father, D. Sister, E. Brother, F. Spouse or Boy/Girl Friend, G. Same Sex Friend, H. A Disliked Male Acquaintance, I. A Recent Acquaintance and J. Ideal Self.

The coordinate grid measure of integrative complexity provides an index of the person's implicit use of lattice structures in the elaboration of similarities between a set of variables. Piaget (1973) described lattice structures as logical networks that define all the possible relationships between a set of coordinated variables. Each variable of a lattice structure is formulated at a level of abstraction that is equal to that of all the other variables. This means each variable, as a member of a lattice group, represents a different facet of the comprehensive abstraction that defines the lattice structure as a whole. Each of these facets are coordinated to reflect a different

view of the whole system but none of the facets provides a more comprehensive perspective on this system than does any other facet. They are all equally informative and as a group systematically elaborate the system as a whole.

In the coordinate grid procedure the subject is asked to rank order a set of persons to one another, in turn, with respect to their general similarity. These instructions request that the subject develop a comprehensive abstraction called 'general similarity' and that they elaborate the various facets of this abstraction by ranking the persons on the grid to one another. This ranking forms a square matrix of numbers that reflect the diversity of constructs attended to in forming the abstract notion of 'general similarity'. The construct 'general similarity' should integrate the similarities and differences between the people ranked in the grid. In integratively complex construction the abstraction referred to as 'general similarity' will possess lattice structure and reflect coordinated differentiation and integration. The ranks of such construction will be both diverse and coherently organized.

The measurement of the lattice structure of this whole is accomplished by ascertaining if any of the persons ranked on the grid tend to have greater weight in determining the meaning of 'general similarity'. If any person is given greater weight then there will be nonreciprocities in the judgments of similarity. For example, if John is ranked

5th like Mary but Mary is ranked 2nd like John, then Mary determines the meaning of 'general similarity' in a superordinate, instead of in a coordinate fashion. That is, Mary is seen to be more like John than John is like Mary. If such superordination/subordination occurs it means Mary is seen as having more in common with the other people than does John and as such preempts the definition of 'general similarity'.

In lattice structures each variable contributes an equal amount of information in defining the system of similarities as a whole. In terms of person perception, the development of lattice structures requires the subject integrate a wide range of characteristics. In such comprehensive construction no person stands out as being either more or less important than any other in defining 'general similarity'. The subject devotes equal attention to all the persons being ranked on the grid. Such elaborate construction occurs when the subject construes in an integratively complex fashion. However, when a person is perceived to be disproportionately similar or dissimilar to other persons then the subject has narrowed their attention to a few characteristics of prime relevance to only that person. This form of construction is not integratively complex.

The general index of integrative complexity is derived by subtracting the coordinate grid from its transpose and

summing the absolute values of the differences. Higher sums represent less coordination and lower integrative complexity. Lower sums indicate greater integrative complexity and more coordinated elaboration of the relationships between the persons on the grid.

The integrative complexity algorithm described above is consistent with principles employed by Coombs (1964) in unfolding techniques. Tversky (1977) also used a related procedure that reflects reciprocities between similarity judgments. Tversky called his procedure feature analysis and used the technique to measure the subject's selective attention to particular features in the course of perception. Neither of the authors appear however to have employed the principle of coordinated relationships to the measurement of lattice structures, developmentally advanced construction or the integratively complex personality.

As a preliminary study to the present study, the reliability of the coordinate grid was explored by administering the grid twice to four different samples of college students. The grid was given under different conditions in order to ascertain the effects of the size of the group tested in each session and the time interval between testings.

Two groups represented the effect of testing in large groups, i.e. 20 to 40 subjects at a time. Two other groups represented smaller numbers of subjects per test

administration, i.e. 8 to 11 subjects. These groups were also divided between immediate test-retest and two week test-retest schedules. In all, four Pearson product-moment correlations were calculated between the test-retest scores. The small group immediate test-retest correlation was highest, r=.74. The next highest reliability was found for the small group two week test-retest interval, r=.63. This reliability was followed by both the large group two week interval and the large group immediate test-retest correlations of r=.54. Fisher's Zr transformations were performed to test the difference between the .74 and .54 correlations. This comparison was the maximum contrast possible. The Z associated with this difference was Z=1.08.

The results suggest the coordinate grid test-retest reliability is low to modest when compared with reliabilities usually expected for personality inventories. The reliabilities found for the coordinate grid do compare well with those typically found for repertory grid measures (Fransella and Bannister, 1977). There is some indication that low reliabilities are generally obtained in grid research because of sensitization effects. Fransella and Bannister discuss this issue and provide evidence that changes usually occur with multiple administrations of grids. They reviewed a number of studies and reported grid reliabilities ranging from r=.35 to r=.92 with the median

reliability being r=.63. This median value falls midway in the range of reliabilities found for the coordinate grid.

It is probable that the coordinate grid has at least some reliability but that there is good reason to suspect the cognitive processes reflected in grids are often variable. Such variability would be consistent with Kelly's (1955) emphasis that construction processes are not fixed but may vary across time and circumstances. The test-retest reliabilities associated with the coordinate grid suggest it is reasonable to assume that integrative complexity is not a personality trait but is instead a cognitive process that may vary for a number of reasons.

Crockett's Cognitive Complexity Measure

Cognitive complexity refers to the number of separate constructs used by the person in differentiation. Cognitive complexity is measured using Crockett's (1965) person description task (see Appendix B). The subjects are asked to spend three minutes writing their descriptions of four people that meet one of the following characteristics: A. A Female I Like, B. A Female I Dislike, C. A Male I Like and D. A Male I Dislike. The number of different constructs used in these four descriptions is determined and this sum serves as the index of cognitive complexity. The test is reported by Crockett (1982) to have a very high test-retest reliability; r=.95.

In the present study the inter-rater reliability was determined by randomly selecting the protocals of thirty subjects. These descriptions were then analyzed by a trained undergraduate assistant. The assistant's ratings of cognitive complexity were then compared with those developed by the author. The correlation between these independent ratings of cognitive complexity was found to be r=.89. The mean complexity for the assistants ratings was m=28.76 and the standard deviation was s=10.29. The mean score according to the author's ratings was m=35.16, with the standard deviation being s=10.48. These results suggest the author perceived the subjects as using more constructs than did the other rater. There is no clear explanation of this finding. The differences between the ratings are however primarily concerned with means and not the rank order of the subjects' complexity. Since the statistics used to test the hypotheses are correlational, there is little reason to believe the difference in these means could effect the tests of the hypotheses. Because the correlation between the ratings was fairly high, it is assumed the inter-rater reliability is adequate.

Cognitive Set: The Understanding Set vs. the Evaluative Set

Crockett, Press and Mahood (1975) developed a procedure for shaping the cognitive set embraced by the subject in forming an impression of a stranger. In the understanding set the subject is asked to try to gain an understanding of the person while reading six descriptions about the person. These instructions were developed to elicit an open or credulous approach to the stranger. The evaluative set instructed the person to be evaluative of the person and this elicited an incredulous approach to the person. The instructions used to elicit either an understanding set or evaluative set are presented in full in Appendix C.

Resolution of Inconsistent Information

Kaplan and Crockett (1968) developed a measure of the person's ability to use abstractions to resolve inconsistent information while forming impressions. The measure was developed from Werner's (1948) theory of cognitive development and provides an index of the extent to which the person uses developmentally advanced cognitive processes in impression formation.

The subject is asked to read six short descriptions of a stranger that were supposedly written by six people who knew the stranger. The paragraphs express views that are inconsistent. Half of the paragraphs describe the stranger engaged in socially appropriate behaviors while the other

half depict the stranger in socially unacceptable activities. The subject is then asked to write a description of the stranger in such a fashion that a friend of theirs who had never heard of the stranger could gain a clear impression of the stranger. The subject is given ten minutes to write their impression of the stranger. Appendix C includes the six paragraphs used in this study and the instructions given to the subjects.

The extent to which the subject resolves the inconsistent information provided in the six descriptions is determined by a procedure described by Crockett, Press, Delia and Kenny (1983). In all there are fifteen levels of resolution. These levels represent variations on three basic cognitive functions. At lower levels of resolution the subject either does not recognize that there is inconsistent information in the paragraphs or simply states that the inconsistency exists. No attempt to resolve the inconsistencies is made. At more moderate levels of resolution the subject recognizes the inconsistencies but attempts to resolve the inconsistencies by only reporting characteristics that are consistent with one another. At higher levels of resolution the subject reports the information as inconsistent when taken out of the context of motivational or situational factors that explain the behaviors. Thus the resolution of inconsistencies in this task requires that the person differentiate consistent from

inconsistent information and that they develop abstractions that integrate this information into a coherent but complex impression of the stranger.

In the present study the inter-rater reliability for the resolution measure was tested by comparing independent ratings made of 30 protocals drawn at random. Ratings were made by the author and a trained undergraduate assistant. The correlation between the scores was r=.96. The mean resolution score for the assistant's ratings was m=9.43, with a standard deviation of s=2.3. The mean for the author's ratings for this group was m=9.5, with the standard deviation being s=2.04. These findings suggest the measurement of resolution was highly reliable.

Subjects

One hundred and forty undergraduates participating for experimental credit took part in this study. The students were recruited by use of a sign-up sheet. There were 68 females in the study and 72 males.

Procedure

Subjects gathered in groups of eight to twelve in a research room. All subjects were asked to read and sign consent forms. These forms were collected and the experiment began.

The subjects sat around a large table. They were told that they would be participating in an investigation of how people perceive others. The subjects were told that the results of their own participation in the study would be held in confidence.

The subjects were given a test booklet (see Appendices A-D) that included all the materials for the study. They were asked not to look ahead in their booklets. The subjects were then asked to read the instructions to either the coordinate grid or to Crockett's cognitive complexity task as the experimenter read them aloud. Appendices A and B include the instructions to each task. The order of these tests was counterbalanced so that some groups began with the grid while others began with the cognitive complexity measure. The subjects were then asked to complete the first task. After this task was completed, the instructions to the second task were read and the subjects were asked to complete this task. Ten minutes were allowed to complete the cognitive complexity measure. As much time as was needed was allowed to complete the coordinate grid. Subjects typically finished the grid in twenty minutes.

When the coordinate grid and cognitive complexity measures were completed, the subjects were asked to read the cognitive set instructions on the next page of their booklets (see Appendix C). After these instructions had been read by the subjects and read aloud by the

experimenter, the subjects were asked to take ten minutes to carefully read the paragraphs describing the stranger, who was referred to in the study as John P. (these paragraphs are listed in Appendix C). When all subjects finished reading the six descriptions they were asked to turn to the next page of their booklet, which included the instructions to the impression formation task (see Appendix C). Subjects were asked to take ten minutes to write all they knew, thought and felt about John P. and to do so in a fashion that would help a friend gain an informed impression of John. After ten minutes the subjects were told the formal part of the experiment was finished but that they were requested to turn to the next page of their booklet in order to complete one final task .

The final part of the booklet contained a check on the effectiveness of the manipulation. This questionnaire is listed in Appendix D. The instructions to the instrument were read and the subjects completed this task. When all subjects had completed the check on the manipulation task they were invited to make comments on the experiment. These comments were noted and the subjects were excused from the experiment.

CHAPTER IV
RESULTS

The ratings on the Check on the Manipulation Questionnaire (Appendix D) were used to calculate indices of the effectiveness of the cognitive set manipulation. Effectiveness scores were determined by summing the ratings on items 1 and 3, which reflect the person's use of an understanding cognitive set, and by summing the ratings for items 2 and 4, which reflect the use of an evaluative set. The total effectiveness score was calculated by subtracting the sum of the evaluative set items from the sum of the understanding set items. Positive scores indicated the subject's use of an understanding set while negative scores indicate the subject's use of an evaluative set. The mean effectiveness score for the understanding cognitive set group was $m=1.71$ with a standard deviation of $s=2.82$. The mean for the evaluative set was $m=-1.61$ with a standard deviation of $s=3.43$. The t value associated with the difference between these means is $t=6.06$. This t value has 139 degrees of freedom and is significant at the $p<.01$ level. The difference between the means was in the expected direction and the conclusion is that the cognitive set manipulation was effective.

It should be noted that there were more subjects in the evaluative set condition, i.e., 83, than in the understanding set condition, which contained 57 subjects. This imbalance was accounted for in all statistical calculations. The difference between the number of subjects in the two cognitive set groups was not planned nor was it detected until after the experiment was completed. Apparently a larger number of subjects that were assigned to the understanding set failed to show up for the experiment. This difference can only be attributed to chance since all sessions were counterbalanced and held at the same time of day across three weeks.

Results by Hypotheses

The hypotheses and results pertaining to each will be addressed in turn.

In the first hypothesis a linear correlation was predicted between integrative complexity and the resolution of inconsistency in impression formation. The results failed to support this prediction since the Pearson product-moment correlation between these variables was r=.02, which is not significant for 140 subjects.

The second hypothesis suggested the person asked to adopt an understanding cognitive set would tend to be more effective in the resolution of inconsistencies than would the person requested to embrace an evaluative cognitive set.

The mean level of resolution for the understanding set was m=9.33 and the standard deviation for this group was s=2.81. The mean level of resolution for the evaluative condition was m=9.39 with the standard deviation for this group being s=2.44. The t-test value for the difference between these means was t=0.0, which is not statistically significant. The second hypothesis thus failed to be supported by the data.

The third hypothesis asserted that cognitive complexity would only be correlated with resolution when in interaction with an understanding cognitive set. Multiple regression analysis was used to test this hypothesis. Results indicated there was not a significant interaction but a main effect for cognitive complexity was found. The F value for the interaction was F=.06, which is not significant. The F value for the cognitive complexity main effect was F=4.94 and the R square value for this main effect was R=.03. This main effect is significant at the p .05 level. These results point to a main effect for cognitive complexity as a predictor of resolution and to the absence of the hypothesized interaction between cognitive complexity and cognitive set. The third hypothesis thus failed to gain support from the data.

The fourth hypothesis contended that a moderate but significant correlation would obtain between cognitive complexity and integrative complexity. The correlation

between these variables was r=-.07, which is not statistically significant. The fourth hypothesis thus failed to be supported.

The fifth and final hypothesis summarized the model developed in the study. It anticipated that integrative complexity and cognitive set would, as a composite variable made up of main effects, be more predictive of the resolution of inconsistencies than would be the interaction between cognitive complexity and cognitive set. The F value for the integrative complexity and cognitive set regression equation was F=.07, which is not statistically significant. The F value associated with the interaction between cognitive complexity and cognitive set was described as being nonsignificant in the above report on hypothesis III. Since neither of the regression equations concerned with the fifth hypothesis were found to be significant, it appears that any differences in their strength of prediction are necessarily theoretically trivial. The fifth hypothesis thus also failed to gain statistical support.

Additional Findings

Although the combined main effects for integrative complexity and cognitive set were found and described above as being not significant, these variables in interaction were significantly related to resolution. The multiple correlation associated with this regression equation was

R=.03. The F value for this interaction equation was F=5.44 which is significant at the p<.01 level.

In order to clarify the meaning of the interaction between integrative complexity and cognitive set, the mean levels of resolution were calculated for the twenty subjects scoring highest in integrative complexity and the twenty subjects scoring lowest in integrative complexity for each cognitive set condition. In the evaluative set the mean level of resolution for those 20 subjects scoring highest in integrative complexity was m=8.1 with the standard deviation being s=2.91. The mean level of resolution for the 20 subjects in the evaluative set that scored lowest on integrative complexity was m=9.65 with the standard deviation being s=1.95. In the understanding set the 20 subjects scoring highest on integrative complexity produced a mean resolution score of m=10.25 with the standard deviation being s=2.14. The mean of resolution for those 20 subjects in the understanding set who scored lowest on integrative complexity was m=9.05 with the standard deviation being s=2.78. These means are illustrated in Figure 1.

The means for those subjects high in integrative complexity did vary significantly between cognitive sets, t=2.66, p<.01. The subjects higher in integrative complexity tended to resolve inconsistencies more when asked to be understanding than when asked to be evaluative. The

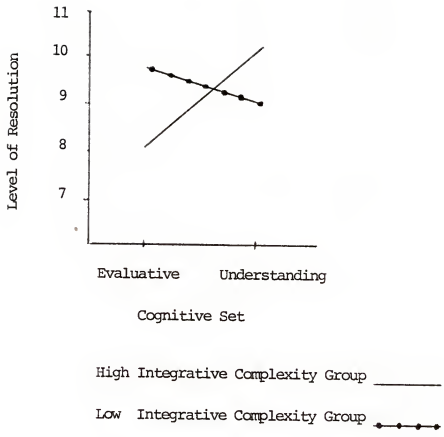

Figure 1: The Resolution Interaction

means of resolution for subjects in the low integrative complexity groups did not differ when compared across cognitive sets, t=.79. Apparently the cognitive set manipulation produced the expected results only for those subjects high in integrative complexity and not for those subjects low in integrative complexity.

The above additional findings suggest the subjects high in integrative complexity tended to adopt their assigned cognitive sets more closely than did those subjects low in integrative complexity. If this was the case then it is reasonable to expect that the subjects higher in integrative complexity also would tend to report having more closely embraced their assigned cognitive set. This was explored by examining the interaction between integrative complexity and cognitive set as predictors of the effectiveness of the cognitive set manipulation. The F value for this interaction was found to be F=3.02, which is significant at the $p<.05$ level. The nature of the interaction is in the directions that would be expected if the more integratively complex subjects did more closely report adopting their assigned cognitive sets. This interaction will thus be described in more detail.

The effectiveness of set means for the four groups of 20 subjects were calculated from the ratings obtained from the Check on the Manipulation Questionnaire (see appendix D). For those 20 in the evaluative set that scored highest on

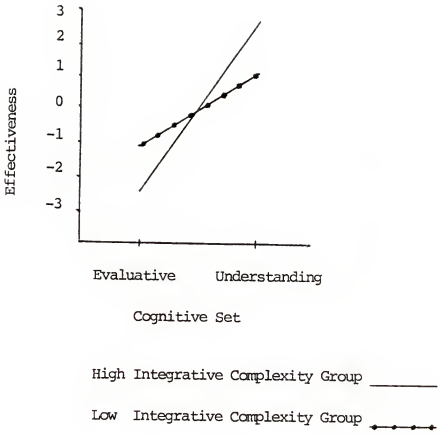

Figure 2: The Effectiveness Interaction

integrative complexity, the effectiveness mean was m=-2.4 with the standard deviation being s=3.81. For those 20 subjects in the evaluative set who had scored lowest on integrative complexity the effectiveness mean was m=-1.25 with a standard deviation of s=2.89. The 20 subjects in the understanding set who had scored highest in integrative complexity produced an effectiveness mean of m=2.65 with a standard deviation of s=2.20. The 20 subjects in the understanding group who had scored lowest on integrative complexity produced an effectiveness mean of m=1.25 with a standard deviation of s=3.12. These means are illustrated in Figure 2.

The subjects low on integrative complexity that were assigned to the understanding set did describe their constructions as being more understanding, m=1.25, than did those low on integrative complexity and in the evaluative set, m=-1.25. The t value for this difference is 2.62, which is statistically significant at the p .05 level. An even larger difference was found however between the means for those high in integrative complexity. For these subjects in the understanding set the effectiveness mean was m=2.65 while the effectiveness mean for those in the evaluative set was m=-2.4. The t value associated with this difference is t=5.21, which is significant at $p<.05$ level. The interaction illustrated in Figure 2 is based on the greater spread between the effectiveness means for the more

integratively complex vs. less integratively complex subjects. Figure 2 suggests the cognitive sets tended to be embraced more by the integratively complex subject than by the subject lower in integrative complexity.

The additional findings illustrated in Figures 1 and 2 suggest the cognitive set manipulation had a greater effect on the subjects higher in integrative complexity than on those low in integrative complexity. This is illustrated by differences in the resolution of inconsistencies and by subjects' reports of the effectiveness of the cognitive set manipulation.

CHAPTER V
DISCUSSION

None of the hypotheses of this study were supported. There are at least four possible explanations of the results obtained in this study. The first is that the ideas developed in the study were inaccurate. The second is that the theoretical assertions of the study were appropriate but these ideas failed to be properly operationalized. A third explanation is that the execution of the experiment was not sufficient to provide unequivocal conclusions. The fourth explanation calls for a refinement of the experimental design and suggests an unpredicted but understandable interaction between integrative complexity and cognitive set. This interaction could have obscured the meaning of the tests of the hypotheses.

The first explanation suggests the theoretical assertions of the study were inaccurate. The hypotheses of this study were formulated to test not only new ideas but were also intended to replicate previously replicated findings. In that the results were not as expected, they could have serious implications for both this study as well as the numerous studies that formed the foundation of this study. Perhaps the understanding of personal constructs that has

emerged across the years is based on a large number of accidental findings that support inaccurate theoretical assertions. This seems unlikely. A more prudent conclusion would be to acknowledge the need to consider other explanations before assuming such a large body of theory and evidence is invalid.

The second explanation is that the operationalization of the variables was inadequate. This possibility is unlikely in that each of the procedures used in this study have produced meaningful results in several previous studies.

A third explanation of the results of this study is that the procedures of the experiment were not conducted properly and thus failed to elicit or measure the variables being studied. There was one issue that arose in the study which directly relates to this explanation of the results.

All the procedures were carried out smoothly and as planned except for the cognitive set manipulation. In the very first group tested, the subjects demonstrated difficulty in grasping or accepting the meaning of the evaluative vs. understanding cognitive set. Crockett's directions were presented to each subject and these instructions were read aloud by the experimenter. An atmosphere of uncertainty and unrest followed these instructions. When the group was asked if the instructions made sense, many subjects said the instructions were not clear. The experimenter read the instructions again and

noted confusion as well as a number of frowns when the instructions stated too often people are overly concerned with understanding and give too little attention to evaluating others and what they do. Within the actual context of the experiment, Crockett's instructions sounded cold and uncaring and seemed to evoke an incredulous orientation to a psychologist who would suggest such a thing.

The experimenter was presented with a difficult problem with only seconds to decide on a solution. The purpose of the cognitive set manipulation was to elicit a particular cognitive approach. Crockett's instructions were not, in my opinion, clear to the subjects and even caused some anxiety in a few subjects. In that the purpose of the manipulation was to elicit different cognitive sets, I decided to paraphrase the instructions and to sanction the temporary adoption of the cognitive sets.

It was explained that 'evaluation' meant an assessment of the good and bad qualities of the person and a synthesis of these characteristics into a general impression of the person. The meaning of 'understanding' was described as the process of seeking to view the many characteristics of the person, including both the good and bad, as well as the many characteristics that are neither good nor bad. 'Understanding' was further described as an inquiry into how these many characteristics portray the specific individual

and help to provide a sense of knowing another person. The subjects were told that the purpose of the experiment was not to ascertain who would choose to judge as opposed to understand another person, but to explore the consequences when subjects cooperatively provided examples of evaluative vs. understanding impressions. Thus it was emphasized that the cognitive set was not a test but only a temporary activity that may or may not be consistent with the subjects' typical approach to others. Although in every group there were subjects that said Crockett's instructions alone did not make sense, all of the subjects suggested the above qualifications of the instructions were clear.

Did this digression from the planned procedure violate the spirit of the study or in some way spoil the experiment? Given that the check on the manipulation did suggest the cognitive set manipultion was at least partially effective, it is assumed this digression was appropriate. It was probably more appropriate than simply extorting responses from confused and wary college students.

It was evident during the experiment that some of the subjects viewed the experimenter with an incredulous eye when the instructions to the evaluative set were read. This observation was confirmed when some of the subjects spontaneously commented in the debriefing sessions that they thought it strange for a psychologist, with presumedly humanistic values, to be asking others to evaluate instead

of understand another person. These observations and comments point not only to possible concerns with the experimental procedures but also provide some evidence that the results of the experiment may have been effected by individual differences with respect to the adoption of the cognitive sets. These developments would tend to support the credibility of the fourth explanation of the results, i.e., that integrative complexity and cognitive set interacted to provide a differential response to the cognitive set instructions.

There were apparently differences in some people's willingness to embrace the evaluative set. Some subjects, but not all, expressed concern over evaluating another person. The possibility that some subjects were less willing to follow the cognitive set instructions was also supported by additional findings suggesting the more integratively complex subjects were more willing to embrace the cognitive sets. Subjects high in integrative complexity tended to resolve inconsistencies more when asked to be understanding than did subjects high in integrative complexity who were asked to be evaluative. The subjects low in integrative complexity did not differ across cognitive sets in their tendencies to resolve inconsistencies. This suggests the subjects low in integrative complexity may not have closely embraced the cognitive sets and this consequently led to an interaction

between cognitive set and integrative complexity as predictors of resolution. There were also indications that the more integratively complex subjects reported following the cognitive set instructions more closely than did the subjects lower in integrative complexity. These results suggest individual differences in responsiveness to the cognitive set occured. These differences could be expected to obscure the meaning of the tests of the hypotheses.

In retrospect these findings are reasonable. Two major components of integrative complexity have been described. The first was a cognitive development component. The second was concerned with the person's style of attending to information. The integratively complex person was described as possessing advanced cognitive abilities as well as typically attending to a wide range of characteristics. Kelly's notion of the credulous approach was described and this open-minded orientation played a central role in the conceptualization and validation of the coordinate grid measure of integrative complexity.

Kelly's thesis on this point is that the credulous approach allows the person to attend to more perspectives and to thus integrate more information in their exploration of the world. The incredulous approach, on the other hand, suggests the person narrows their construction to a few issues concerned with particular needs, interests or prejudices. Research with the coordinate grid and

personality inventories in fact suggested that the integratively complex person tended to be more open-minded, trusting, spontaneous and enthusiastic. Those lower in integrative complexity tended to be more dogmatic, skeptical, inhibited and rigid. These grid studies thus suggested that the integratively complex person did tend to embrace the credulous approach.

Given the tendency for those higher in integrative complexity to be more willing to embrace many perspectives, it is probably reasonable to assume they would be more willing to embrace a cognitive set proposed to them in a psychological experiment. This is especially true when the set was sanctioned as being only a temporary proposition that they were asked to entertain for the advancement of science. It may be reasonable to assume that this sanction would be more readily accepted by the trusting, open-minded, integratively complex person than by the characteristically skeptical and dogmatic person low in integrative complexity. This could explain the individual differences in responsiveness to the cognitive set manipulation. Such an interpretation of the findings would suggest the need for refinements in the experimental design and would advise against assuming that the major ideas of the study have been invalidated.

The somewhat winding path that has emerged in this discussion may now be challenging the concientious reader's

discrimination of what is rationalization and what is scientific fair play. In order to assuage these anxieties it will now be concluded that the results of the study are inconclusive. It appears that another investigation of the hypotheses of the study is needed. Several plausible explanations of the results have been provided. The ideas of the study may be wrong; the measures used to reflect the variables may be inadequate; on-the-spot changes in the cognitive set procedure may have invalidated the experiment; or individual differences in responsiveness to the cognitive set may call for a refinement in the design.

The major question with this study concerns the cognitive set manipulation. In order to extend the discussion beyond the somewhat speculative stages provided so far, a follow-up study was performed to determine the relationship between integrative complexity and resolution when no cognitive set instructions are provided. If the integratively complex person is, upon request, more willing to be both more understanding and more evaluative, then such flexibility should characterize the integratively complex person's spontaneous orientation in impression formation.

To test the above prediction the coordinate grid and the impression formation task used in the original study were administered to 42 additional undergraduate students. The inter-rater reliability for the resolution measure was found to be r=.92. The correlation between integrative complexity

and level of resolution was found to be r=-.33, which is significant at the p<.05 level. Higher numbers on the grid test indicate lower integrative complexity and higher numbers on the resolution measure indicate greater resolution. The results suggest that when allowed to form their own cognitive sets, the more integratively complex person tends to be more effective in the resolution of inconsistencies.

At this time it is appropriate to advise that some caution be taken in interpreting the correlations of this study. The magnitudes of the correlations reported in both the original and follow-up studies are small. The correlations reported in previous studies using the measures employed in the present studies also tended to be small. These magnitudes may be a function of the difficulties inherent in comparing patterns of cognition arising from different contexts. Constructions developed by reading six paragraphs about a stranger are probably not directly related to constructions of people already known to a person. The consistency of the findings that have emerged from the present and previous studies do suggest however that the tests do reflect basic cognitive patterns that have at least some generality across diverse contexts of construction. Caution should however be maintained with respect to any assumption that all areas of construction are similarly structured by the person.

The findings of the follow-up study are significant but modest. The correlation between integrative complexity and level of resolution does support the retrospective explanation that calls for a refinement of the original design. When left to their own choices, the integratively complex persons appear to form impressions like those formed by integratively complex subjects asked to be understanding instead of evaluative. Paradoxically, it is this spontaneous openness that could also lead them to temporarily narrow their constructions, upon request, to evaluative concerns. This paradox has been observed by other authors. Joseph Conrad (1920) wrote in Lord Jim:

> Your really imaginative people swing further in any direction, as if given a longer scope of cable in the uneasy anchorage of life. (p. 224)

George Kelly (1955) soberly expressed a related view in describing a therapeutic scenario:

> As long as he is tethered with a short rope, he may be able to conform to most of society's expectations; but if he is turned loose on the open range, his thinking may go galloping away beyond anyone's reach. (p. 865)

These observations are relevant to future research in that experimenters who manipulate cognitive set may encounter different lengths of cable or tether (integrative complexity) in different subjects.

The study has provided some evidence that there is a need for refinement in the experimental design before a fair test of the hypotheses is possible. The primary lesson of this

study may be that future researchers exploring cognitive sets should be alert to individual differences in the formation of cognitive sets. Personal construct theory and the results of this study suggest more trusting and open-minded people may be more responsive to our invitations to view the world from various perspectives.

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APPENDIX A
INTEGRATIVE COMPLEXITY

Instructions to the Coordinate Grid

Rank the persons listed above the column of the grid according to their general similarity to the persons at the beginning of each row of the grid. Begin with row A. Notice that Myself as a column person has automatically been given the rank '1'. This is because we naturally assume Myself is most like Myself. Your first task is to find the column person most like yourself and to assign this person the rank '2'. Next find the person next most like Myself and give this person the rank '3'. Look at the column persons that have not received a rank on row A and give the one most like Myself the rank '4'. The person next most like yourself gets the rank '5' the next '6' and so on until each column person has received some rank between '1-10'. When all the column persons have been ranked on row A then go to row B. My Mother is assumed to be most like My Mother so the '1' rank has already been assigned. You will begin ranking with the rank '2'. Find the column person most like your mother and give this person the rank '2' on the second row. Find the column person next most like your mother and give them the rank '3' and so on until all the column people

have been ranked to My Mother. When you finish row B go to C and then D and so on until the entire grid is finished.

Never use the same rank more than once in any row. The same rank may appear up and down (in the columns) but not in the same row.

Sometimes a person listed on the grid has no direct relevance to a person taking the test. For example, if you are an only child then you do not have a brother or sister. If a person on the grid has no relevance to you then think of some person that has acted like the missing person would have acted. Use this person instead of the irrelevant person listed on the grid.

It is very important that once you decide who the person listed on the grid is going to be that you do not change persons. If My Sister is your sister Mary on row A do not switch to your sister Susan on row C. To help you remember the persons you are ranking place their initials or first name on the grid page beside the rows and above the columns. If you have any questions ask them now and at any other time.

Each of the people to be ranked on the grid should satisfy one, but only one, of the following characteristics: a. Myself, b. My Mother, c. My Father, d. My Brother, e. My Sister, f. My Spouse (girl friend or boy friend), g. My Same-Sex Friend, h. A Male Acquaintance I Dislike, i. A Recent Female Acquaintance, and j. My Ideal Self.

The Coordinate Grid of One of the Subjects

Column Persons

Row Persons	a.	b.	c.	d.	e.	f.	g.	h.	i.	j.
a.	1	4	2	9	6	10	7	8	5	3
b.	2	1	5	4	7	6	8	10	9	3
c.	2	7	1	6	9	3	8	5	10	4
d.	3	5	4	1	6	7	8	2	9	10
e.	2	6	10	5	1	7	3	8	4	9
f.	9	8	7	3	4	1	6	2	5	10
g.	2	9	10	6	3	4	1	7	5	8
h.	3	8	7	2	6	5	4	1	9	10
i.	2	8	9	7	3	5	4	10	1	6
j.	2	4	3	9	5	10	7	8	6	1

APPENDIX B
COGNITIVE COMPLEXITY

In this part of the experiment you will be asked to describe four people that you know well. You will not be asked to give any names. You will be given three minutes to describe four people, twelve minutes in all. These people should be people you know well and that fit one of the following descriptions: a. A Female I Like, b. A Male I Like. c. A Female I Dislike, and d. A Male I Dislike. Please write as much as you can about the person. Describe the person in a way that would help a friend of yours that does not know the people gain a quick but comprehensive view of the persons. Do not begin until you are asked.

A. A Female I Like

B. A Male I Like

C. A Female I Dislike

D. A Male I Dislike

APPENDIX C
RESOLUTION OF INCONSISTENCY

Impression Formation Instructions

The Understanding Set Instructions

You are about to read six descriptions of John P. that were written by six people that know him well. We ask that you take a certain attitude towards John as you read these descriptions. Too often people are overly concerned with evaluating and give too little attention to understanding other people. These days it is especially important that we understand others and what they do. Therefore as you read about John P. please be especially concerned with understanding him as a person and with understanding his behavior.

The Evaluation Set Instructions

You are about to read six descriptions of John P. that were written by six people that know him well. We ask that you take a certain attitude towards John as you read these descriptions. Too often people are overly concerned with understanding and give too little attention to evaluating others and what they do. Therefore as you read about John P. please be especially concerned with evaluating him as a person and with evaluating his behavior.

Six Descriptions of John P.

1. Unenthusiastic, thats how I see John P. He is in my history class this semester. We are supposed to work in groups on a project to present to the rest of the class. These projects require a lot of effort and are important for our grades. Whenever we meet to work on the project John just complains. We just haven't gotten much done. John is bad for the group. He acts like everything is boring or stupid or just wrong. He needs more enthusiasm.

2. John was on the activity committee for our dorm. I think he is very stubborn. He showed very little flexibility and little interest in anything but what he wanted. One should have a broader range of interests and more give-and-take to be on an activity committee. Several times John's stubborn lack of cooperation with the team effort caused us not to get several good activities off the ground. I think he just likes to argue. If he sets his mind against something, people seem to drop the issue just to avoid a fight with him.

3. I know John primarily through working with him as a fellow volunteer at the crisis intervention center. I have seen him put in many hours talking with clients and I never once saw him become impatient or fail to show deep consideration for the clients. He

works closely with the other volunteers and will cover for you when you can't make it to man the phones. He is a good example for us all and everyone around the center likes him.

4. I've known John for about three years. The thing that impresses me most about John is his loyalty to his friends. I mean like the other night, some of us were out drinking and one of the group started criticizing a friend of John's that wasn't present. The guy was really unfair and we all knew his criticisms were mean. John asked him to stop it. John wasn't heavy or angry about it. He seemed disappointed. Anyway, its nice to know you have a friend like John. Someone that is always your friend.

5. John P. is a generous person. Unlike most people, John is a friend through thick and thin. He likes to have a good time but he's also there when you really need somebody. For example, when my school loans were late last semester John loaned me $100 to get me over the hump. John really cares. He is both generous and trusting.

6. John P. is a very sarcastic person. I rarely know how to take him. He is always saying nice things but its obvious he doesn't mean the things he says. He knows just how to zoom-in and compliment people on

just the things that he and everybody else knows are your weak points. He doesn't do it to flatter you. He does it to be mean. I don't like you.

Your Description of John P.

Please take the next ten minutes to write a description of John P. Write in a fashion that would help a friend of yours gain as much information as possible about John. Please do not begin until asked.

APPENDIX D
CHECK ON THE MANIPULATION QUESTIONNAIRE

Sometimes psychological research does not always proceed in the way planned. People do not always understand instructions or they become confused as they complete the tasks. Although such misunderstandings are common and are no reflection on the person, they can lead to considerable confusion over the true meaning of the experiment's results. In order for us to determine the extent to which the experiment's results may have been influenced by misunderstandings or confusion, it is important that you complete the following questionnaire. In completing the questionnaire you should read the statements and then circle the number that best represents your agreement with the statement. The number '1' indicates the statement is very true for you, '2' means moderately true, '3' means somewhat true, '4' means moderately untrue and '5' means the statement is strongly false for you.

1. When reading and thinking about John P., I was careful to evaluate John by focusing on his good or bad points instead of trying to understand why he would do the things he does.

1.....2.....3.....4.....5

2. It was more important to me to understand why John P. acted in so many different ways than it was to decide whether he was a good or bad person.

1.....2.....3.....4.....5

3. When considering John P. I was careful to adopt a detached objective perspective and I tried to avoid putting myself in his shoes.

1.....2.....3.....4.....5

4. In forming my impression of John P. I sought to see the world and his behavior by considering his motives and the external circumstances that determine his behavior instead of seeking to report the positivity or negativity of his behavior.

1.....2.....3.....4.....5

BIOGRAPHICAL SKETCH

William Chambers was born in 1954 in Greenwood, Mississippi. He attended school in Greenwood until 1970. He graduated from Habersham Central High school in Clarkesville, Georgia, in 1972. After a year of construction work, Bill attended Friends World College and studied psychology in New York, England, Wales, and India. Bill received the B.A. degree from F.W.C. in 1978. The next year was spent making cabinets as a student at Coosa Valley Vocational Tech, in Rome, Georgia. Following this time he worked for the M.A. degree in humanistic psychology at West Georgia College. He received support during this time from the Governor's Intern Program. In 1980 he began work at the University of Florida for the doctorate in psychology. While a student at U.F., Bill has been supported by research and teaching assistantships and by the hard work of his wife, Janie Smith Chambers. Bill and Janie have two children, Hannah and Grace.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Franz R. Epting, Chairman
Professor of Psychology

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Wilse B. Webb
Graduate Research Professor,
Psychology

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

William J. Froming
Associate Professor of Psychology

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

James J. Algina
Associate Professor, Foundations of
Education

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

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Assistant Professor of Psychology

This dissertation was submitted to the Graduate Faculty of the Department of Psychology in the College of Liberal Arts and Sciences and to the Graduate School, and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

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Dean for Graduate Studies and Research